



PATENT  
Attorney Docket No. DPL-039

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

APPLICANT(S): Willig  
SERIAL NO.: 10/712,177 GROUP NO.: Not yet assigned  
FILING DATE: November 13, 2003 EXAMINER: Not yet assigned  
TITLE: Achromatic Fiber-Optic Power Splitter and Related Methods

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

**INFORMATION DISCLOSURE STATEMENT**

Sir:

In accordance with the provisions of 37 C.F.R. 1.97 and 1.98, Applicants hereby make of record the patents and publications listed on the accompanying Form PTO-1449, and other information contained herein; for consideration by the Examiner in connection with the examination of the above-identified patent application. In accordance with the U.S. Patent Office's partial waiver of the requirement under 37 C.F.R. 1.98(a)(2)(i), only copies of the foreign patent documents and non-patent publications are enclosed.

**REMARKS**

In accordance with the provisions of 37 C.F.R. 1.97, this statement is being filed (CHECK ONE):

- ☒ (1) within three (3) months of the **filing date** of a national application other than a continued prosecution application under 37 C.F.R. 1.53(d), or within three (3) months of the **date of entry of the national stage** as set forth in 37 C.F.R. 1.491 in an international application, or before the mailing of the **first Office action** on the merits, or before the mailing of a **first Office action** after the filing of a request for continued examination under 37 C.F.R. 1.114; or
- ☐ (2) after the period defined in (1) but before the mailing date of a **final action** or a **notice of allowance** under 37 C.F.R. 1.311, and
- ☐ the requisite Statement is below, **OR**
- ☐ the requisite fee under 37 C.F.R. 1.17(p), namely **\$180.00**, is included herein, or

- ☐ (3) after the mailing date of a **final action** or **notice of allowance** but before the payment of the **issue fee**, **AND**
- ☐ the requisite Statement is below, **AND**
- ☐ the requisite petition fee under 37 C.F.R. 1.17(p), namely **\$180.00** is included herein.

It is respectfully requested that each of the patents and publications listed on the attached Form PTO-1449, and other information contained herein, be made of record in this application.

### STATEMENT

As required under 37 C.F.R. 1.97(e), Applicant(s), through the undersigned, hereby state either that [check the appropriate space only if either (2) or (3) is checked on the previous page and the Statement is required]:

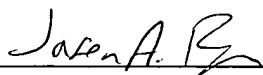
- ☐ 1. Each item of information contained in the Information Disclosure Statement was first cited in any communication from a foreign patent office in a counterpart foreign application **not more than three months** prior to the filing of the Information Disclosure Statement; or
- ☐ 2. No item of information contained in the Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing this Statement after making reasonable inquiry, no item of information contained in the Information Disclosure Statement was known to **any individual** designated in 37 C.F.R. 1.56(c) **more than three months** prior to the filing of the Information Disclosure Statement.

Respectfully submitted,

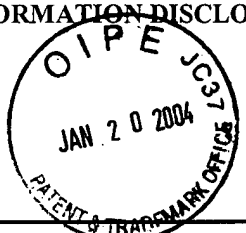
Date: January 15, 2004  
Reg. No. 41,513

Tel. No.: (617) 248-7589  
Fax No.: (617) 248-7100

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Jason A. Reyes  
Attorney for the Applicants  
Testa, Hurwitz, & Thibault, LLP  
High Street Tower  
125 High Street  
Boston, Massachusetts 02110

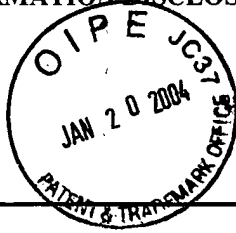
<b>FORM PTO - 1449</b>  <b>INFORMATION DISCLOSURE STATEMENT</b>				<b>ATTORNEY DOCKET NO.: DPL-039</b>  <b>APPLICANT(S): Willig</b>  <b>SERIAL NO.: 10/712,177</b>  <b>FILING DATE: November 13, 2003</b>  <b>GROUP: Not yet assigned</b>			
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U.S. PATENT DOCUMENTS							
EXAM. INIT.	DOCUMENT NUMBER	DATE	NAME	CLASS	SUB CLASS	FILING DATE IF APPROPRIATE	
	A1	4,008,061	02/15/77	Ramsay			
	A2	4,204,852	05/27/80	Watts et al.			
	A3	4,392,712	07/12/83	Ozeki			
	A4	4,487,477	12/11/84	Helms et al.			
	A5	4,490,163	12/25/84	Jochem et al.			
	A6	4,902,323	02/20/90	Miller et al.			
	A7	4,920,366	04/24/90	Bowen et al.			
	A8	4,979,972	12/25/90	Berkey et al.			
	A9	5,044,716	09/03/91	Berkey			
	A10	5,297,233	03/22/94	Lerminiaux			
	A11	5,408,556	04/18/95	Wong			
	A12	5,410,626	04/25/95	Okuta et al.			
	A13	Re. 35,138	01/02/96	Weidman			
	A14	5,664,037	09/02/97	Weidman			
	A15	5,923,470	07/13/99	Pan et al.			
	A16	6,370,919 B1	04/16/02	Kossat et al.			
	A17	6,406,197 B1	06/18/02	Okuda et al.			

FOREIGN PATENT DOCUMENTS									
EXAM. INIT.	DOCUMENT NUMBER	DATE	COUNTRY CODE	CLASS	SUB CLASS	FILING DATE	ABSTRACT ONLY	ENGLISH LANG (Y/N)	
	B1	0 527 427 B1	11/15/95	EP					

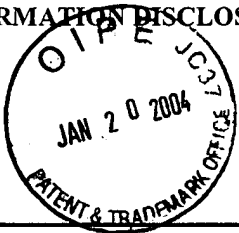
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OTHER ART, JOURNAL ARTICLES, ETC.		
<b>EXAM. INIT.</b>	<b>OTHER DOCUMENTS: (Including Author, Title, Date, Relevant Pages, Place of Publication)</b>	
	C1	Bahrampour et al., "Theoretical Analysis of Spectral Hole Burning and Relaxation Oscillation in All-Optical Gain Stabilized Multichannel Erbium-Doped Fiber Amplifier (EDFA)," Journal of Lightwave Technology, 19 (8), August 2001, pp. 1130-1139.
	C2	Barron et al., "Multimode power combiners pump up," Photonics Spectra, January 2002, pp. 153, 154, 156, 158.
	C3	Berger et al., "Combining up to eight telescope beams in a single chip," 2000, 10 pages.
	C4	Booyesen et al., "Wavelength insensitive fiber optic sensor based on an axially strained fused coupler," SPIE, 2070, Fiber Optic and Laser Sensors XI, 1993, pp. 322-332.
	C5	El-Sabban et al., "Design of an integrated optical magic T for astronomy applications," Applied Optics, 39 (36), December 20, 2000, pp. 6781-6786.
	C6	Gadonna et al., "Reliability Evaluation for PON Power Splitters," SPIE, 2290, July 1994, pp. 170-184.
	C7	Grant et al., "Low-cost $M \times N$ couplers in silica-on-silicon for passive optical networks," International Journal for Optoelectronics, 9 (2), 1994, pp. 159-170.
	C8	Hanafusa et al., "Wavelength-flattened couplers fabricated from single-mode fibers with different core parameters," Optical Fiber Sensors, Springer Proceedings in Physics, 44, 1989, pp. 334-338
	C9	Hussey et al., "Fabrication of wavelength-flattened tapered couplers using polishing for cladding removal," Electronics Letters, 24 (17), August 18, 1988, pp. 1072-1073.
	C10	Ilev et al., "High efficiency wideband beam-splitter mirror for optical fibre reflectometry," International Journal of Optoelectronics, 9 (3), 1994, pp. 285-287.
	C11	Izutsu et al., "Operation mechanism of the single-mode optical-waveguide Y junction," Optics Letters, Vol. 7 (3), March 1982, pp. 136-138.
	C12	Kern et al., "Planar Integrated Optics contribution to instrumentation for interferometry," 2000, 12 pages.
	C13	Kishioka, "A Design Method To Achieve Wide Wavelength-Flattened Responses in the Directional Coupler-Type Optical Power Splitters," Journal of Lightwave Technology, 19 (11), November 2001, pp. 1705-1715.
	C14	Lee, "A Research Paper on Erbium Doper Fiber Amplifiers," <a href="http://www.jps.net/hansel/erbium">http://www.jps.net/hansel/erbium</a> , 1996, 8 pages.
	C15	Little et al., "Design Rules for Maximally Flat Wavelength-Insensitive Optical Power Dividers Using Mach-Zehnder Structures," IEEE Photonics Technology Letters, 9 (12), December 1997, pp. 1607-1609.

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	C16	Luo et al., "Experimental and Theoretical Analysis of Relaxation-Oscillations and Spectral Hole Burning Effects in All-Optical Gain-Clamped EDFA's for WDM Networks," Journal of Lightwave Technology, 16 (4), April, 1998, pp. 527-533.
	C17	Moore et al., "Optimization of Tap Couplers Made by the FBT Process," <a href="http://www.gouldfo.com/tech/MADRAS.pdf">http://www.gouldfo.com/tech/MADRAS.pdf</a> , 6 pages.
	C18	Neyer et al., "A Beam Propagation Method Analysis of Active and Passive Waveguide Crossings," Journal of Lightwave Technology, LT-3 (3), June 1985, pp. 635-642.
	C19	Nolan, "Tapered-fiber couplers, MUX and DEMUX," Handbook of Optics, IV, Chapter 8, 10 pages.
	C20	Oakley et al., "Loss and spectral control in fused tapered couplers," Optical Engineering, 33 (12), December 1994, pp. 4006-4019.
	C21	Okamoto, "Theoretical Investigation of Light Coupling Phenomena in Wavelength-Flattened Couplers," Journal of Lightwave Technology, 8 (5), May 1990, pp. 678-683.
	C22	Orta et al., "A design technique for wideband optical couplers," SPIE, 2449, pp. 375-383.
	C23	O'Sullivan et al., "Truly wavelength-flattened monolithic couplers," Electronics Letters, 33 (4), February 13, 1997, pp. 321-322.
	C24	Rajaram et al., "Intelligent EDFAs are essential for metro networks," <a href="http://lw.pennet.com/Articles/Article_Display.cfm?Section=OnlineArticle&amp;Su">http://lw.pennet.com/Articles/Article_Display.cfm?Section=OnlineArticle&amp;Su</a> , 3 pages.
	C25	Takagi et al., "Silica-Based Waveguide-Type Wavelength-Insensitive Couplers (WINC's) With Series-Tapered Coupling Structure," Journal of Lightwave Technology, 10 (12), December 1992, pp. 1814-1824.
	C26	Tekippe et al., "Production, performance and reliability of fused couplers," pp. 1-6.
	C27	Weidman et al., "Fiber-based, slope adjustable filter elements provide EDFA gain tilt-control," Turn of the Volume, Guidelines, Corning, Summer 2001, 2 pages.
	C28	Witte et al., "Branching elements for optical data buses," Applied Optics, 20 (4), February 15, 1981, pp. 715-718.
	C29	Yanagawa et al., "Silica-based star-coupler planar lightwave circuit for passive double-star network," International Journal of Optoelectronics, 9 (2), 1994, pp. 151-158.
	C30	"Profiles of selected companies: Gould Electronics Inc.: products in the marketplace; strategies,": <a href="http://www.dialogselect.com/business">http://www.dialogselect.com/business</a> , February 1995, 1 page.
	C31	"Wavelength Flattened Couplers," <a href="http://www.gouldfo.com/products/">http://www.gouldfo.com/products/</a> , 2 pages.

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	<b>C32</b>	"Single Window Tap Couplers<10% Coupling Ratio," <a href="http://www.gouldfo.com/products/">http://www.gouldfo.com/products/</a> , 7 pages.	
	<b>C33</b>	"Fiber optic beam splitters/combiners," OZ Optics Ltd., September 1999, pp. 1-5.	
	<b>C34</b>	"Fused fiber optic couplers," OZ Optics Ltd., September 1999, 2 pages.	
	<b>C35</b>	"Erbium Doped Fiber Amplifier," ADVA Optical Service & Solutions, 2 pages.	
	<b>C36</b>	Goff, "Semiconductor Optical Amplifiers," Fiber Optic Reference Guide, excerpt from Chapter 7, 1999, pp. 81-83, 88.	
	<b>C37</b>	"Optical Fiber Amplifiers: Gain And Noise Figure," Hewlett-Packard, pp. 67-86.	
	<b>C38</b>	"Polka dot beamsplitters," Thermo Oriel, <a href="http://www.thermo.com/">http://www.thermo.com/</a> , 2 pages.	
	<b>C39</b>	"Polka-dot beamsplitters," Edmund Industrial Optics, <a href="http://www.edmundoptics.com/">http://www.edmundoptics.com/</a> , 2001, 2 pages.	

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